Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL QUALITY MEASURES CLEARINGHOUSE

General

Title

High body mass index (BMI) follow-up: percentage of children ages 3 through 17 years with a BMI greater than or equal to 85th percentile who had a blood pressure percentile documented and classified as normal or abnormal during the measurement year.

Source(s)

Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC). Basic measure information: hypertension screening for children who are overweight or obese. Ann Arbor (MI): Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC); 2015 Apr. 47 p.

Measure Domain

Primary Measure Domain

Clinical Quality Measures: Process

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure is used to assess the percentage of children ages 3 through 17 years with a body mass index (BMI) greater than or equal 85th percentile who had a blood pressure percentile documented and classified as normal or abnormal during the measurement year. A higher proportion indicates better performance.

This measure is calculated as three individual rates, as well as an overall rate that is composite of the three individual rates. The individual rates are:

The percentage of children who had documentation of systolic blood pressure percentile (systolic numerator divided by denominator).
The percentage of children who had documentation of diastolic blood pressure percentile (diastolic numerator divided by denominator).

The percentage of children who had classification of blood pressure as normal or abnormal (classification numerator divided by denominator).
The overall rate is the percentage of children who met all three criteria, even if each occurred during a separate visit.

This measure summary represents the overall rate.

Rationale

Obesity in children is associated with a broad spectrum of serious health issues, including obstructive sleep apnea, asthma, hypertension, nonalcoholic fatty liver disease, type 2 diabetes mellitus, depression, orthopedic problems, and skin conditions (Barlow, 2007). While childhood obesity rates have stabilized over the past decade, the percentage of young children and adolescents who are overweight or obese remains high (Ogden et al., 2014). For the 2011–2012 period, nearly 32% of children in the United States were reported to be overweight (having a body mass index [BMI] greater than or equal to 85th percentile on sex-specific age-for-growth charts), and 17% were obese (having a BMI greater than or equal to 95th percentile) (Ogden et al., 2014).

As levels of body fat increase above the 85th percentile of BMI, health risks also rise proportionally. Using BMI as an initial screen of body fat, providers can identify pediatric patients who, because of their excess weight, have health risks that need to be addressed (Barlow, 2007; Speiser et al., 2005). Specifically, the risk for high blood pressure (hypertension) in children is proportional to their degree of excess body fat (Tu et al., 2011). Below the 85th percentile, the association between BMI and hypertension is negligible. However, once BMI reaches the 85th percentile, risk of high blood pressure increases fourfold, along with the risk of target organ damage, which is indicative of early cardiovascular disease (Tu et al., 2011). Given that hypertension in children usually carries into adulthood, interventions to reduce BMI to below the 85th percentile will have important health benefits. Documenting and classifying blood pressure as normal or abnormal is an important element of care for children who are overweight or obese.

Evidence for Rationale

Barlow SE, Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. Pediatrics. 2007 Dec;120(Suppl):S164-92. PubMed

Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. JAMA. 2014 Feb 26;311(8):806-14. PubMed

Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC). Basic measure information: hypertension screening for children who are overweight or obese. Ann Arbor (MI): Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC); 2015 Apr. 47 p.

Speiser PW, Rudolf MC, Anhalt H, Camacho-Hubner C, Chiarelli F, Eliakim A, Freemark M, Gruters A, Hershkovitz E, Iughetti L, Krude H, Latzer Y, Lustig RH, Pescovitz OH, Pinhas-Hamiel O, Rogol AD, Shalitin S, Sultan C, Stein D, Vardi P, Werther GA, Zadik Z, Zuckerman-Levin N, Hochberg Z, Obesity Consensus Working Group. Childhood obesity. J Clin Endocrinol Metab. 2005 Mar;90(3):1871-87. PubMed

Tu W, Eckert GJ, DiMeglio LA, Yu Z, Jung J, Pratt JH. Intensified effect of adiposity on blood pressure in overweight and obese children. Hypertension. 2011 Nov;58(5):818-24. PubMed

Primary Health Components

High body mass index (BMI); overweight; obese; hypertension screening; systolic blood pressure percentile; diastolic blood pressure percentile; children

Denominator Description

The eligible population for the denominator is the number of children ages 3 through 17 years with a body mass index (BMI) greater than or equal to 85th percentile who had an outpatient care visit during the measurement year (January 1 to December 31). See the related "Denominator Inclusions/Exclusions" field.

Numerator Description

The eligible population for the numerator is the number of children ages 3 through 17 years with a body mass index (BMI) greater than or equal to 85th percentile who had documentation of 1) systolic blood pressure percentile, 2) diastolic blood pressure percentile, and 3) classification of blood pressure as normal or abnormal, even if each occurred during a separate outpatient care visit during the measurement year (January 1 to December 31). See the related "Numerator Inclusions/Exclusions" field.

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

A clinical practice guideline or other peer-reviewed synthesis of the clinical research evidence

A formal consensus procedure, involving experts in relevant clinical, methodological, public health and organizational sciences

A systematic review of the clinical research literature (e.g., Cochrane Review)

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

Importance
Childhood overweight and obesity are recognized as major medical and public health problems associated with serious medical complications over the life course, including conditions such as hypertension, type 2 diabetes, and metabolic syndrome (Speiser et al., 2005). Early screening and identification of weight status in children is critical to prevent and treat childhood overweight and obesity and the attendant risk factors of excess weight. Primary care providers measure weight and height at yearly visits throughout childhood and calculate body mass index (BMI) by dividing weight by height squared. Overweight is defined as a BMI score from the 85th to 94th percentile on sex-specific age-for-growth charts; obesity is defined as a BMI greater than or equal to 95th percentile (Barlow, 2007). Childhood obesity is the leading cause of pediatric hypertension. While disabling cardiovascular disease is unlikely to develop during childhood, markers of target organ damage (that is, damage to the major organs fed by the circulatory system, such as the kidneys) can be detected in young children. This underscores the urgency of diagnosing and addressing hypertension promptly (Falkner, 2010). Guidelines call for measuring blood pressure in children yearly; systolic or diastolic readings greater than or equal to 95th percentile for age, height, and sex are considered abnormal and indicative of hypertension (Expert Panel on Cardiovascular Health and Risk Reduction in Children and Adolescents, 2011).

Prevalence of Obesity and Unhealthy Weight in Children

Significant increases in the prevalence of United States (U.S.) childhood obesity across both sexes were seen in the 1980s and 1990s (Ogden et al., 2012). For the 2011–2012 period, nearly 32% of children in the United States were reported to be overweight or obese (having a BMI greater than or equal to 85th percentile) and at least 17% were obese (having a BMI greater than or equal to 95th percentile) (Ogden et al., 2014). At the population level, this increase in prevalence is too rapid to be a genetic shift. Rather, changes in eating and physical activity behaviors are affecting the intake and expenditure of energy, resulting in overweight and obesity (Barlow, 2007).

Cost of Obesity and Unhealthy Weight in Children

Excess weight in young people creates great economic burden. Children who are obese are approximately three times more expensive for the health care system than the average insured child, and children diagnosed with obesity are two to three times more likely to be hospitalized (Marder & Chang, 2006). In a study by Wang et al. (2008), the authors used projected overweight/obesity prevalence and national estimates of per capita excess health care costs of overweight/obesity to estimate that health care costs attributable to overweight/obesity in the entire U.S. population would reach between $861 and $957 billion by 2030, accounting for 16% to 18% of U.S. health care costs.

Pathology and Severity of Obesity and Unhealthy Weight in Children

Medical issues associated with obesity affect almost every organ of the body, though some conditions are without symptoms and signs (Barlow, 2007). Obese children are more likely to suffer from respiratory issues such as disordered breathing (Wing et al., 2003), which can lead to right ventricular hypertrophy and pulmonary hypertension, as well as inattention, poor academic performance, and enuresis (Barlow, 2007). Asthma also occurs more frequently among children who are obese (Barlow, 2007). Gastrointestinal problems include nonalcoholic fatty liver disease (NAFLD), which is related to both obesity and diabetes (Barlow, 2007); gallstones (Kaechele et al., 2006); and gastroesophageal reflux disease and constipation, which are worsened by obesity (Barlow, 2007). Obese children are more likely to have endocrine disorders such as abnormal glucose metabolism (sometimes called pre-diabetes), which indicates higher risk for the development of diabetes (Li et al., 2009); type 2 diabetes mellitus, polycystic ovary syndrome; and hypothyroidism (Barlow, 2007). Cardiovascular problems for overweight/obese children include dyslipidemia (Lamb et al., 2011) and hypertension (Barlow, 2007). Orthopedic problems include Blount disease (a visible bowing of the lower extremities), slipped capital femoral epiphysis, and an increased risk of fractures, musculoskeletal pain, and orthopedic problems (Dietz, Gross, & Kirkpatrick, 1982; Manoff, Banffy, & Winell, 2005). Skin conditions include acanthosis nigricans, a chronic irritation and infection in the folds of the skin (Nguyen et al., 2001). Metabolic syndrome, a cluster of concurrent conditions (abnormal triglycerides, large waist circumference, and high blood pressure) that increase the risk of heart disease, stroke, and diabetes is not yet defined in children (Speiser et al., 2005). However, among severely obese children, the risk of developing metabolic syndrome has been estimated at 50% (Weiss et al., 2004).

Children who are obese also contend with psychiatric problems, including depression, anxiety, and eating disorders (Barlow, 2007). One study found that among female adolescents who were obese, patterns of observation showed more adverse social, educational, and psychological correlates (Falkner et al., 2001). Children who are obese may also be at risk for academic difficulties, alcohol and tobacco use, premature sexual behavior, inappropriate dieting practices, and physical inactivity (Daniels et al., 2009). Increasing weight is associated with decreasing health-related quality of life, lower body satisfaction, and lower self-esteem. Children who are overweight experience more teasing and are vulnerable to bullying (Daniels et al., 2009). Children share society's negative opinions about those who are overweight or obese, regardless of their own weight status or sex (Speiser et al., 2005). Their perceptions of obesity emphasize laziness, selfishness, lower intelligence, social isolation, poor social functioning, as well as low levels of perceived health, healthy eating, and activity. Children as young as 5 years of age are aware of their own levels of overweight, which affects their perceptions of appearance, athletic ability, social competence, and self-worth (Speiser et al., 2005). Research has also shown that children diagnosed with obesity are much more likely to be diagnosed with mental health disorders or bone and joint disorders than children who are not obese; they are also two-to-three times more likely to be hospitalized (Marder

& Chang, 2006).

Being overweight or obese in early life also has implications for a child's future health. First, for a child with a BMI above the 85th percentile, medical risks include future or persistent obesity (Barlow, 2007; Daniels et al., 2009). The risk of an obese child becoming an obese adult is 25% at age 6 years, increasing to 75% during adolescence (Baker et al., 2010). Being overweight or obese in childhood and adolescence is also associated with increased risk of premature mortality and comorbidities in adulthood. A 2011 systematic review reports a significant association between child and adolescent overweight/obesity and premature mortality, with hazard ratios ranging from 1.4 to 2.9 (Reilly & Kelly, 2011). In addition, being overweight or obese as a child or adolescent is significantly associated with increased risk of cardiometabolic morbidity (including diabetes, hypertension, heart disease, and stroke) in later life, with hazard ratios ranging from 1.1 to 5.1, as well as increased risk of asthma in adulthood and polycystic ovary syndrome in adult women (Reilly & Kelly, 2011). Obesity in in adolescence is associated with negative self-image that persists into adulthood (Dietz, 1998). These children are also at long-term higher risk for chronic conditions such as breast, colon, and kidney cancer; musculoskeletal disorders; and gall bladder disease (Daniels et al., 2009). Childhood obesity contributes to a significant and increasing burden of chronic disease, rising health care costs, disability, and premature death.

Performance Gap
Barlow et al. (2002) found that more than 95% of pediatricians and pediatric nurse practitioners routinely evaluated blood pressure in children. Five years later, Hansen et al. (2007) similarly reported that 94% of clinicians documented blood pressure values. These rates of measurement are encouraging, as a thorough medical evaluation must precede decisions about appropriate interventions and therapies for obese and overweight children (Barlow et al., 2002). However, Hansen et al. (2007) further reported that among the 4% of children whose blood pressure readings marked them as hypertensive, only 26% of these patients had a diagnosis of hypertension documented in their medical record. For the 3% of children diagnosed with pre-hypertension, only 11% had a correct diagnosis in their medical record. Thus, although these children had blood pressure measured, a meaningful proportion may not have had adequate assessment of that measurement.

Children who were obese had somewhat better odds for receiving a documented diagnosis (hypertension odds ratio = 2.61 [1.49-4.55]; pre-hypertension = 1.90 [0.90-4.0]). The authors hypothesized that pediatricians are trained to look more carefully for abnormal blood pressure in overweight children; such readings occur in more than 30% of such patients (Hansen, Gunn, & Kaelber, 2007). However, any missed diagnosis is costly. If hypertension is not identified in pediatric patients, it may be years before it is detected in the patient as an adult, allowing end-organ damage to progress. Because effective treatments exist for hypertension, the long-term outcomes could be avoided with an earlier diagnosis (Hansen, Gunn, & Kaelber, 2007).

Why do clinicians fail to appropriately identify hypertension if the data necessary for diagnosis are present in the medical records? Practitioners may be unaware of diagnostic thresholds for hypertension in younger children and may not pay attention to it in children who are not obese (Hansen, Gunn, & Kaelber, 2007). Lack of awareness of previous blood pressure readings may also be a problem (Hansen, Gunn, & Kaelber, 2007). Other challenges related to the diagnosis of pediatric hypertension may include a lack confidence in the readings themselves (Flynn, 2008); the cumbersome nature of the sex, age, and height percentile method of hypertension assessment for use in clinical practices (Falkner, 2010); and difficulties in providing interventions to control blood pressure and encourage lifestyle changes (Falkner, 2010). Lack of reimbursement is also a barrier to care for children who are obese (Barlow, 2007), and gaps exist between treatment of childhood obesity and what is covered by health insurance (Daniels et al., 2009). Klein et al. (2010) reported that more than half of providers surveyed perceived that coverage for referral and adjunct services was limited. Gaps in coverage restrict the services and referrals available for overweight patients.

See the original measure documentation for additional evidence supporting the measure.

Evidence for Additional Information Supporting Need for the Measure

Baker JL, Farpour-Lambert NJ, Nowicka P, Pietrobelli A, Weiss R, Childhood Obesity Task Force of the European Association for the Study of Obesity. Evaluation of the overweight/obese child--practical tips for the primary health care provider: recommendations from the Childhood Obesity Task Force of the European Association for the Study of Obesity. Obes Facts. 2010;3(2):131-7. PubMed

Barlow SE, Dietz WH, Klish WJ, Trowbridge FL. Medical evaluation of overweight children and adolescents: reports from pediatricians, pediatric nurse practitioners, and registered dietitians. Pediatrics. 2002 Jul;110(1 Pt 2):222-8. PubMed

Barlow SE, Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. Pediatrics. 2007 Dec;120(Suppl):S164-92. PubMed

Daniels SR, Jacobson MS, McCrindle BW, Eckel RH, Sanner BM. American Heart Association Childhood Obesity Research Summit: executive summary. Circulation. 2009 Apr 21;119(15):2114-23. PubMed

Dietz WH, Gross WL, Kirkpatrick JA. Blount disease (tibia vara): another skeletal disorder associated with childhood obesity. J Pediatr. 1982 Nov;101(5):735-7. PubMed

Dietz WH. Health consequences of obesity in youth: childhood predictors of adult disease. Pediatrics. 1998 Mar;101(3 Pt 2):518-25. PubMed

Expert Panel on Integrated Guidelines for Cardiovascular Health, and Risk Reduction in Children and Adolescents, National Heart, Lung, and Blood Institute. Expert panel on integrated guidelines for cardiovascular health and risk reduction in children and adolescents: summary report. Pediatrics. 2011 Dec;128 Suppl 5:S213-56. PubMed

Falkner B. Hypertension in children and adolescents: epidemiology and natural history. Pediatr Nephrol. 2010 Jul;25(7):1219-24. PubMed

Falkner NH, Neumark-Sztainer D, Story M, Jeffery RW, Beuhring T, Resnick MD. Social, educational, and psychological correlates of weight status in adolescents. Obesity Res. 2001 Jan;9(1):32-42. PubMed

Flynn JT. Pediatric hypertension: recent trends and accomplishments, future challenges. Am J Hypertens. 2008 Jun;21(6):605-12. PubMed

Hansen ML, Gunn PW, Kaelber DC. Underdiagnosis of hypertension in children and adolescents. JAMA. 2007 Aug 22;298(8):874-9. PubMed

Kaechele V, Wabitsch M, Thiere D, Kessler AL, Haenle MM, Mayer H, Kratzer W. Prevalence of gallbladder stone disease in obese children and adolescents: influence of the degree of obesity, sex, and pubertal development. J Pediatr Gastroenterol Nutr. 2006 Jan;42(1):66-70. PubMed

Klein JD, Sesselberg TS, Johnson MS, O'Connor KG, Cook S, Coon M, Homer C, Krebs N, Washington R. Adoption of body mass index guidelines for screening and counseling in pediatric practice. Pediatrics. 2010 Feb;125(2):265-72. PubMed

Lamb MM, Ogden CL, Carroll MD, Lacher DA, Flegal KM. Association of body fat percentage with lipid concentrations in children and adolescents: United States, 1999-2004. Am J Clin Nutr. 2011 Sep;94(3):877-83. PubMed

Li C, Ford ES, Zhao G, Mokdad AH. Prevalence of pre-diabetes and its association with clustering of cardiometabolic risk factors and hyperinsulinemia among U.S. adolescents: National Health and Nutrition Examination Survey 2005-2006. Diabetes Care. 2009 Feb;32(2):342-7. PubMed

Manoff EM, Banffy MB, Winell JJ. Relationship between Body Mass Index and slipped capital femoral epiphysis. J Pediatr Orthop. 2005 Nov-Dec;25(6):744-6. PubMed

Marder W, Chang S. Childhood obesity: costs, treatment patterns, disparities in care, and prevalent medical conditions. Thomson Medstat Research Brief; 2006.

Nguyen TT, Keil MF, Russell DL, Pathomvanich A, Uwaifo GI, Sebring NG, Reynolds JC, Yanovski JA. Relation of acanthosis nigricans to hyperinsulinemia and insulin sensitivity in overweight African American and white children. J Pediatr. 2001 Apr;138(4):474-80. PubMed

Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of childhood and adult obesity in the United States, 2011-2012. JAMA. 2014 Feb 26;311(8):806-14. PubMed

Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. JAMA. 2012 Feb 1;307(5):483-90. PubMed

Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC). Basic measure information: hypertension screening for children who are overweight or obese. Ann Arbor (MI): Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC); 2015 Apr. 47 p.

Reilly JJ, Kelly J. Long-term impact of overweight and obesity in childhood and adolescence on morbidity and premature mortality in adulthood: systematic review. Int J Obes (Lond). 2011 Jul;35(7):891-8. PubMed

Speiser PW, Rudolf MC, Anhalt H, Camacho-Hubner C, Chiarelli F, Eliakim A, Freemark M, Gruters A, Hershkovitz E, Iughetti L, Krude H, Latzer Y, Lustig RH, Pescovitz OH, Pinhas-Hamiel O, Rogol AD, Shalitin S, Sultan C, Stein D, Vardi P, Werther GA, Zadik Z, Zuckerman-Levin N, Hochberg Z, Obesity Consensus Working Group. Childhood obesity. J Clin Endocrinol Metab. 2005 Mar;90(3):1871-87. PubMed

Wang Y, Beydoun MA, Liang L, Caballero B, Kumanyika SK. Will all Americans become overweight or obese? Estimating the progression and cost of the US obesity epidemic. Obesity (Silver Spring). 2008 Oct;16(10):2323-30. PubMed

Weiss R, Dziura J, Burgert TS, Tamborlane WV, Taksali SE, Yeckel CW, Allen K, Lopes M, Savoye M, Morrison J, Sherwin RS, Caprio S. Obesity and the metabolic syndrome in children and adolescents. N Engl J Med. 2004 Jun 3;350(23):2362-74. PubMed

Wing YK, Hui SH, Pak WM, Ho CK, Cheung A, Li AM, Fok TF. A controlled study of sleep related disordered breathing in obese children. Arch Dis Child. 2003 Dec;88(12):1043-7. PubMed

Extent of Measure Testing

Reliability

Data and Methods. Testing data were obtained through an audit of medical records maintained by HealthCore, Inc. HealthCore is an independent subsidiary of Anthem, Inc., the largest health benefits company/insurer in the United States. HealthCore owns and operates the HealthCore Integrated Research Database (HIRD), a longitudinal database of medical and pharmacy claims and enrollment information for

members from 14 geographically diverse Blue Cross and/or Blue Shield Health Plans in the Northeast, South, West, and Central regions of the United States with members living in all 50 states. In total, the HIRD includes approximately 59 million individuals between January 2006 and June 2014.

More than 12 million members were enrolled at some point during the 2013 measurement year for this study, among which 2.3 million were aged 2 to 18 years old. There were 637,100 children aged 2 to 18 with a routine outpatient encounter in 2013, who were currently enrolled and were fully insured. This group was narrowed to a subset who had a provider with a specialty of pediatric medicine or general practice/family practice (451,003). One child per family was then randomly selected, resulting in 293,741 eligible children from all 50 states, as well as the District of Columbia and territories such as Puerto Rico and the Virgin Islands.

A simple random sample (SRS) was used to select 27,000 candidates for a parent survey, of which 26,569 (98%) had valid contact information. From this group, a total of 1,580 parent surveys were completed, of which 402 had a body mass index (BMI) greater than or equal to 85th percentile according to parent-reported height and weight for their eligible child. Additionally, an independent SRS of 750 candidates was selected to provide additional cases for medical record abstraction to ensure the study goal for abstracted charts would be achieved; 722 children from this group had valid contact information. Combining these two groups, medical records were requested for review for 1,124 (402+722) children. In total, 600 medical records were reviewed and abstracted.

Once subjects were identified, patient medical records were requested from provider offices and health care facilities; these records were sent to a centralized location for data abstraction. Trained nurse or pharmacist medical record abstractors collected and entered information from paper copies of the medical records into a password-protected database. To help ensure consistency of data collection, the medical record abstractors were trained on the study's design and presented with a standardized data collection form designed to minimize the need to make subjective judgments during the abstraction process. In addition, data entered onto a scanner form and subsequently scanned was reviewed through a series of quality checks.

Reliability of medical record data was determined through re-abstraction of patient record data to calculate the inter-rater reliability (IRR). Broadly, IRR is the extent to which the abstracted information is collected in a consistent manner. Low IRR may be a sign of poorly executed abstraction procedures, such as ambiguous wording in the data collection tool, inadequate abstractor training, or abstractor fatigue. For this measure, the medical record data collected by two abstractors was individually compared with the data obtained by a senior abstractor to gauge the IRR for each abstractor. Any differences were remedied by review of the chart. IRR was determined by calculating both percent agreement and Cohen's Kappa statistic.

Results. Data were abstracted from 600 medical records; 91 children (15.2%) met denominator criteria for being between 3 through 17 years and having a recorded BMI greater than or equal to 85th percentile, based on a BMI percentile recorded by the provider. Of these, six records (6.6%) from the two abstractors were reviewed for IRR. Agreement was assessed for six measure variables, including documentation of BMI greater than or equal to 85th percentile, blood pressure, systolic blood pressure value, diastolic blood pressure value, and both height and weight (necessary to calculate BMI).

Table 3 in the original measure documentation shows the percent agreement and Kappa statistic for each measure variable. Abstractor agreement for all variables (documentation of BMI greater than or equal to 85th percentile, blood pressure, systolic blood pressure, diastolic blood pressure, height, and weight) was 100%, with a Kappa statistic of 1. These results indicate a perfect level of IRR was achieved for all measure variables.

Validity

Face Validity. Face validity is the degree to which the measure construct characterizes the concept being assessed. The face validity of this measure was established by a national panel of experts and advocates for families of children with high BMI convened by the Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC). The Q-METRIC expert panel included nationally recognized

experts in childhood obesity, representing pediatrics, nephrology, nutrition and dietetics, endocrinology, gastroenterology, health behavior/education, and family advocacy. In addition, measure validity was considered by experts in state Medicaid program operations, health plan quality measurement, health informatics, and health care quality measurement. In total, the Q-METRIC High BMI Follow-up panel included 17 experts, providing a comprehensive perspective on childhood obesity and the measurement of quality metrics for states and health plans.

The Q-METRIC expert panel concluded that this measure has a high degree of face validity through a detailed review of concepts and metrics considered to be essential to effective management and treatment of childhood obesity. Concepts and draft measures were rated by this group for their relative importance. This measure was very highly rated, receiving an average score of 7.9 (with 9 as the highest possible score).

Abstracted Medical Record Data. This measure was tested using medical record data. This source is considered the gold standard for clinical information; our findings indicate that these data have a high degree of face validity and reliability. In total, 600 charts were reviewed.

The eligible population for the denominator is the number of children, ages 3 through 17 years old, with a BMI greater than or equal to 85th percentile, who had an outpatient care visit during the measurement year (January 1–December 31). This measure was tested using two methods for determining the denominator:

Calculated BMI greater than or equal to 85th percentile; based on BMI calculated from height and weight recorded in the medical record.
Recorded BMI greater than or equal to 85th percentile; based on a BMI percentile recorded in the medical record.

Three individual numerators and one overall composite of the three numerators are calculated:

Systolic - The percentage of children who had documentation of systolic blood pressure percentile (systolic numerator divided by denominator).
Diastolic - The percentage of children who had documentation of diastolic blood pressure percentile (diastolic numerator divided by denominator).
Classification - The percentage of children who had classification of blood pressure as normal or abnormal (classification numerator divided by denominator).
Overall - The percentage of children who met all three criteria, even if each occurred during a separate visit within the measurement year.

Calculated BMI. A total of 207 children (34.5%) met denominator criteria for being between 3 through 17 years old and having a calculated BMI greater than or equal to 85th percentile, based on height and weight from the medical record (refer to Table 4 in the original measure documentation). Among children with a calculated BMI greater than or equal to 85th percentile, 2.4% (n=5) of children had documentation of systolic blood pressure percentile; 2.4% (n=5) had documentation of diastolic blood pressure percentile, and none (n=0) had documentation of classification of blood pressure as normal or abnormal. Consequently, none of the children (n=0) met all three criteria.

Recorded BMI. Overall, 91 children (15.2%) met denominator criteria for being between 3 through 17 years old and having a recorded BMI greater than or equal to 85th percentile, based on a BMI percentile recorded by the provider (refer to Table 5 in the original measure documentation). Among children with a recorded BMI greater than or equal to 85th percentile, 6.6% (n=6) of children had documentation of systolic blood pressure percentile; 6.6% (n=6) had documentation of diastolic blood pressure percentile, and 3.3% (n=3) had documentation of classification of blood pressure as normal or abnormal. Overall, one child (1.1%) met all three criteria.

Evidence for Extent of Measure Testing

Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC). Basic measure information: hypertension screening for children who are overweight or obese. Ann Arbor (MI): Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC); 2015 Apr. 47 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Ambulatory/Office-based Care

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Individual Clinicians or Public Health Professionals

Statement of Acceptable Minimum Sample Size

Specified

Target Population Age

Age 3 through 17 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Aim

Better Care

National Quality Strategy Priority

Prevention and Treatment of Leading Causes of Mortality

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Data Collection for the Measure

Case Finding Period

January 1 to December 31 of the measurement year

Denominator Sampling Frame

Patients associated with provider

Denominator (Index) Event or Characteristic

Clinical Condition

Encounter

Patient/Individual (Consumer) Characteristic

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions
The eligible population for the denominator is the number of children ages 3 through 17 years with a body mass index (BMI) greater than or equal to 85th percentile who had an outpatient care visit during the measurement year (January 1 to December 31).

Note: Refer to Table 1 in the original measure documentation for codes to identify outpatient care visits.

Exclusions

Inpatient stays, emergency department visits, and urgent care visits are excluded from the calculation.
A diagnosis of pregnancy during the measurement year excludes the patient from the calculation.

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions
The eligible population for the numerator is the number of children ages 3 through 17 years with a body mass index (BMI) greater than or equal to 85th percentile who had documentation of 1) systolic blood pressure percentile,* 2) diastolic blood pressure percentile, and 3) classification of blood pressure** as normal or abnormal, even if each occurred during a separate outpatient care visit during the measurement year (January 1 to December 31).

Documentation, as determined by medical record review, must include, at a minimum, a note containing the date on which each test was conducted.

Note: Refer to Table 1 in the original measure documentation for codes to identify outpatient care visits.

**Blood Pressure Percentile*: The percentile ranking based on the National Heart, Lung, and Blood Guidelines, which are based on age, sex, and height percentile. Percentiles are available for both systolic and diastolic blood pressures.

***Blood Pressure Classification*: Based on blood pressure percentiles, children can be classified into categories of normal (less than 95th percentile) and abnormal (greater than or equal to 95th percentile).

Exclusions
Reporting of systolic and/or diastolic blood pressure only is not sufficient to qualify as a numerator event.

Numerator Search Strategy

Fixed time period or point in time

Data Source

Electronic health/medical record

Paper medical record

Type of Health State

Does not apply to this measure

Instruments Used and/or Associated with the Measure

Unspecified

Computation of the Measure

Measure Specifies Disaggregation

Measure is disaggregated into categories based on different definitions of the denominator and/or numerator

Basis for Disaggregation

This measure is disaggregated based on different definitions of the numerator. The three numerators are:

> Systolic - The number of eligible children who had documentation of systolic blood pressure percentile.
> Diastolic - The number of eligible children who had documentation of diastolic blood pressure percentile.
> Classification - The number of eligible children who had classification of blood pressure as normal or abnormal.

This measure summary represents the overall rate: The number of eligible children who met all three criteria, even if each occurred during a separate visit within the measurement year.

Scoring

Rate/Proportion

Interpretation of Score

Desired value is a higher score

Allowance for Patient or Population Factors

not defined yet

Standard of Comparison

not defined yet

Identifying Information

Original Title

Hypertension screening for children who are overweight or obese.

Measure Collection Name

High Body Mass Index (BMI) in Children Follow-up Measures

Submitter

Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC) - Academic Affiliated Research Institute

Developer

Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC) - Academic Affiliated Research Institute

Funding Source(s)

This work was funded by the Agency for Healthcare Research and Quality (AHRQ) and the Centers for Medicare & Medicaid Services (CMS) under the Children's Health Insurance Program Reauthorization Act (CHIPRA) Pediatric Quality Measures Program Centers of Excellence grant number U18 HS020516.

Composition of the Group that Developed the Measure

High BMI in Children Follow-Up Expert Panels

Representative Panel

Adam Becker, PhD, MPH, Executive Director, Consortium to Lower Obesity in Chicago Children (CLOCC), Chicago, IL
Craig Belsha, MD, Professor of Pediatrics, St. Louis University, Director of the Pediatric Hypertension Program, SSM Cardinal Glennon Children's Medical Center, St. Louis, MO
Nancy Butte, PhD, MPH, RD, Professor of Pediatrics, USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine, Houston, TX
Elena Fuentes-Afflick, MD, MPH, Chief of Pediatrics, San Francisco General Hospital, Vice Dean for Academic Affairs and Faculty Development, Vice Chair and Professor of Pediatrics, Epidemiology and Biostatistics, University of California San Francisco, San Francisco, CA
Suzanne Lazorick, MD, MPH, Assistant Professor of Pediatrics and Public Health, Brody School of Medicine, East Carolina University, Greenville, NC
Esther F. Myers, PhD, RD, Chief Science Officer, Academy of Nutrition and Dietetics, St. Louis, MO
Stephen Pont, MD, MPH, FAAP, Assistant Professor of Pediatrics, University of Texas Southwestern Medical Center, Austin, TX
Dennis Styne, MD, Professor of Pediatrics, Director of Pediatric Endocrine Fellowship Program, University of California Davis School of Medicine, Davis, CA
Miriam Vos, MD, MSPH, Assistant Professor of Pediatrics, Division of GI, Hepatology and Nutrition, Emory University School of Medicine, Research Program Director, Child Wellness, Children's Healthcare of Atlanta, Atlanta, GA
Nora Wells, Med, Director of Programs, Co-Director of National Center for Family/Professional Partnerships, Family Voices, Boston, MA

Feasibility Panel

Cathy Call, BSN, MSEd, MSN, Senior Policy Analyst and Director for Health Quality Research, Altarum Institute, Alexandria, VA
J. Mitchell Harris, PhD, Director of Research and Statistics, Children's Hospital Association, (formerly NACHRI), Alexandria, VA
Don Lighter, MD, MBA, FAAP, FACHE, Director, The Institute for Health Quality Research and Education, Knoxville, TN
Paula Lozano, MD, MPH, Assistant Director Preventive Care, Group Health Cooperative, Associate Investigator, Group Health Research Institute, Group Health Physician, Seattle, WA
Sue Moran, BSN, MPH, Director of the Bureau of Medicaid Program Operations and Quality Assurance, Michigan Department of Community Health, Lansing, MI
Joseph Singer, MD, Vice President Clinical Affairs, HealthCore, Inc., Wilmington, DE
Stuart Weinberg, MD, Assistant Professor of Biomedical Informatics, Assistant Professor of Pediatrics, Vanderbilt University, Nashville, TN

Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC) Investigators

Joyce M. Lee, MD, MPH, Associate Professor, Department of Pediatrics and Communicable Diseases, School of Medicine, University of Michigan, Ann Arbor, MI
Gary L. Freed, MD, MPH, Professor of Pediatrics, School of Medicine, Professor of Health Management and Policy, School of Public Health, University of Michigan, Ann Arbor, MI (principal investigator)
Kevin J. Dombkowski, DrPH, MS, Research Associate Professor of Pediatrics, School of Medicine, University of Michigan, Ann Arbor, MI

Financial Disclosures/Other Potential Conflicts of Interest

Unspecified

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2015 Apr

Measure Maintenance

Unspecified

Date of Next Anticipated Revision

Unspecified

Measure Status

This is the current release of the measure.

The measure developer reaffirmed the currency of this measure in January 2016.

Measure Availability

Source available from the Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC) Web site. Support documents are also available.

For more information, contact Q-METRIC at 300 North Ingalls Street, Room 6C08, SPC 5456, Ann Arbor, MI 48109-5456; Phone: 734-232-0657; Fax: 734-764-2599.

NQMC Status

This NQMC summary was completed by ECRI Institute on September 29, 2015. The information was verified by the measure developer on November 2, 2015.

The information was reaffirmed by the measure developer on January 7, 2016.

Copyright Statement

Production

Source(s)

Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC). Basic measure information: hypertension screening for children who are overweight or obese. Ann Arbor (MI): Quality Measurement, Evaluation, Testing, Review, and Implementation Consortium (Q-METRIC); 2015 Apr. 47 p.

Disclaimer

NQMC Disclaimer